

REMARKS

Introduction

In response to the Office Action dated June 6, 2008, Applicants have amended claims 1 and 24. Claim 26 has been cancelled. Support for amended claims 1 and 24 is found in, for example, Figs. 2A and 3A; pg. 16, line 12 - pg. 17, line 14; pg. 18, line 10 – pg. 19, line 11. Care has been taken to avoid the introduction of new matter. In view of the foregoing amendments and the following remarks, Applicants respectfully submit that all pending claims are in condition for allowance.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 24, 27, 28, 31, and 32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 2000-057640 to Akiyama in view of U.S. Patent No. 4,169,031 to Brors. Applicants traverse.

An aspect of amended claims 1 and 24 includes a distance between each sputtering surface and the at least one substrate/workpiece is progressively larger.

Turning to the prior art, Akiyama states in Para. [0026] of the computer translation:

In addition, distance between the targets 14 and substrates 16 in each membrane formation room was set to 70 mm (*emphasis added*).

Akiyama fails to disclose or suggest, at a minimum, a distance between *each* sputtering surface and the at least one substrate/workpiece is *progressively larger*, as required by amended claims 1 and 24.

Brors discusses clamping the cathode disc 24 via a clamping ring 22 to sputter deposit an electrically insulative material. Thus, the distance between each sputtering surface and the

substrate is constant. Brors fails to disclose or suggest, at a minimum, a distance between *each* sputtering surface and the at least one substrate/workpiece is *progressively larger*, as required by amended claims 1 and 24.

As Akiyama and Brors do not disclose the same cathode sputter apparatus as disclosed by the present inventors, and even if combined still fail to disclose or suggest the elements recited by amended claims 1 and 24, the combination of Akiyama and Brors does not render the apparatus as recited by amended claims 1 and 24 obvious.

Claims 1-4, 6, 7, 11, 13, 15-17, 20, 24, 25, 29, and 30 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Akiyama in view of Brors and further in view of U.S. Patent No. 4,894,133 to Hedgcoth.

The Office Action admits that Akiyama and Brors does not discuss: rearranging the order of magnets; a second set of targets to coat a second side of the substrate; cathode targets being in substantial vertical registry; cathode/target assemblies of the first and second groups of cathode/target assemblies located within a single vacuum chamber; cathode/target assemblies of the first and second groups of cathode/target assemblies forming an in-line or circular-shaped arrangement within the vacuum chamber; cathode/target assemblies of the first and second groups of cathode/target assemblies are located in a plurality of vacuum chambers; the plurality of vacuum chambers forming an in-line or a circularly-shaped arrangement of chambers; each cathode/target assembly of the first and second groups of cathode/target assemblies is a planar magnetron cathode/target assembly including a magnetron magnet means; the magnetron magnet means of at least some of the planar magnetron cathode/target assemblies are of different lengths, widths, or diameters; means for transporting the at least one substrate/workpiece past the first and second groups of cathode/target assemblies for deposition of the first, second pluralities

of sub-layers includes means for mounting and transporting at least one disk-shaped substrate/workpiece; forming perpendicular magnetic recording medium; and the inner and outer diameter of the magnets are not discussed. The Office Action relies on Hedgcoth in an attempt to cure the admitted deficiencies of Akiyama and Brors. The Office Action asserts that Hedgcoth teaches forming a perpendicular magnetic recording medium.

Figs. 1 and 2 of Hedgcoth show a group of cathode/target assemblies where the distance between the sputtering surface of each cathode/target assembly and the substrate remains *constant*. The target source to substrate distance is preferably maintained within a range of 2 to 4 inches. Hedgcoth states in col. 4, lines 55-56:

The target dimensions are approximately the same as the nucleating targets 42 (emphasis added).

Thus, Hedgcoth fails to disclose or suggest, at a minimum, a distance between *each* sputtering surface and the at least one substrate/workpiece is *progressively larger*, as required by amended claims 1 and 24. None of the cited references, individually or combined, disclose or infer that the sputtering surfaces of at least one cathode/target assembly of the first and second groups of cathode/target assemblies are located at a *different spacing* from the first and second surfaces of the at least one substrate/workpiece than another of the cathode/target assemblies, as required by claim 13.

Further, contrary to the Examiner's assertion, Hedgcoth does not discuss depositing a *perpendicular* magnetic recording medium on a magnetically soft underlayer. Hedgcoth describes a cobalt/nickel alloy source, not a *perpendicular* magnetic recording medium in the section cited by the Examiner. Hedgcoth fails to disclose or remotely suggest, at a minimum, transporting at least one substrate for a perpendicular magnetic recording medium, as required in independent claim 13. Thus, Hedgcoth fails to cure the deficiencies of Akiyama and Brors.

Claims 12 and 21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Akiyama in view of Brors, and further in view of Hedgcoth, and further in view of U.S. Patent No. 5,441,615 to Mukai et al. (hereinafter Mukai).

Claims 12 and 21 depend from claims 1 and 13, respectively, and include all of the features of their base claim plus additional features, which are not taught or suggested by the cited references. Therefore, for at least these reasons, it is respectfully submitted that claims 12 and 21 are also patentably distinguishable over the cited references.

Claim 26 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Akiyama in view of Brors, and further in view of Hedgcoth, and further in view of JP 56-152963 to Kobayashi et al. (hereinafter JP '963).

Applicants respectfully submit that the rejection is moot in view of the foregoing amendment cancelling claim 26. However, amended claim 1, introduced in this amendment, includes the pertinent limitations of claims 26.

The Examiner contends that Kobayashi teaches that the cathode/target assemblies are placed at different distances from the substrate.

Although not relied upon to do so, Kobayashi does not discuss utilizing a **magnetron** for the targets. Kobayashi does not address the shape or the diameter size of the magnetron magnet assemblies. Kobayashi is *silent* on a first group of annularly-shaped magnetron magnet assemblies. Kobayashi is *silent* regarding each annularly-shaped magnetron magnet assembly having a diameter corresponding to a thickness profile for depositing the selected material. Further, there is no teaching, suggestion, or motivation either implicitly or explicitly in Kobayashi of annularly-shaped magnetron magnet assemblies or their diameter corresponding to a thickness profile for depositing the selected material. Therefore, Kobayashi cannot be relied

upon to cure the deficiencies of Akiyama, Brors, and Hedgcoth. As none of the references disclose the subject matter of amended claim 1, thus, the combination of Kobayashi, Akiyama, Brors, and Hedgcoth would be missing the aforementioned features of the claimed subject matter. Moreover, it would not have been obvious to modify the cited references to yield the subject matter of amended claim 1.

In rejecting a claim under 35 U.S.C. § 103, the Examiner is required to discharge the initial burden by, *inter alia*, making "**clear and particular**" factual findings as to a **specific understanding or specific technological principle** which would have **realistically** impelled one having ordinary skill in the art to modify an applied reference to arrive at the claimed invention based upon facts, -- not generalizations. *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 57 USPQ2d 1161 (Fed. Cir. 2000); *Ecolochem Inc. v. Southern California Edison, Co.*, 227 F.3d 1361, 56 USPQ2d 1065 (Fed. Cir. 2000); *In re Kotzab*, *supra*; *In re Dembiczak*, 175 F.3d 994, 50 USPQ2d 1614 (Fed. Cir. 1999). That burden has not been discharged, as the Examiner has provided no factual basis for modifying a distance between each sputtering surface and at least one substrate to be progressively larger, **and** substituting annular-shaped magnetron magnet assemblies having progressively increasing diameters, as required by amended claim 1.

The only teaching of the claimed annular-shaped magnetron magnet assemblies having progressively increasing diameters and a distance between each sputtering surface and at least one substrate that is progressively larger is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The Examiner's retrospective assessment of the claimed invention and use of unsupported conclusory statements are not legally sufficient to

generate a case of *prima facie* obviousness. The motivation for modifying the prior art must come from the prior art and must be based on facts. *In re Lee*, 277 F.3d 1338 (Fed. Cir. 2002).

Thereby as taught in the instant specification, the sputtered film thickness profile is a function of the diameter d of the annularly-shaped cathode/target assembly and of the spacing between the sputtering surface and the precursor substrate during sputter deposition (see, e.g., pg. 16, lines 23-25 and pg. 18, lines 23-27 of the originally filed specification). However, none of the cited references disclose or suggest this, and apparently are unaware of the unexpected improvement in overall sputtered film thickness provided by the claimed cathode sputtering apparatus.

Claim 23 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Akiyama in view of Brors and further in view of Hedgcoth, and further in view of U.S. Patent No. 5,326,637 to Nasu et al.

Claim 23 depends from claim 13 and includes all of the features of their base claim plus additional features, which are not taught or suggested by the cited references.

Withdrawal of the foregoing rejections is respectfully requested.

Conclusion

In view of the above amendments and remarks, Applicants submit that this application should be allowed and the case passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper,

including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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